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PERMANENT LAYOFFS AND DISPLACED WORKERS:
Cyclical Sensitivity, Concentration, and Experience Following the Layoff

by

Garnett Picot and Wendy Pyper

No. 55

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ABSTRACT

Concern about permanent layoffs and the experiences of displaced workers is high because of the restructuring in firms currently taking place, and the effect of changes in international trade on some industries, often leading to layoffs. Our understanding of permanent layoffs has been hampered by the lack of appropriate data until recently. This paper uses two relatively new sources of data to examine (1) the variation in permanent layoffs over the business cycle, primarily to determine their significance during expansionary periods when decreases in aggregate demand play little role in the layoff process, (2) Where permanent layoff are concentrated in the economy during expansionary periods when restructuring and the competitive process play the major role in layoffs, and (3) the labour market experiences of displaced workers following the layoff.

There is a large volume of permanent layoffs during both expansions and contractions...they are not as cyclically sensitive as hires, quits or temporary layoffs, other means by which firms adjust their labour forces. The completive process appears to play a large role in generating such a large volume of permanent layoffs (1 million), even during expansions. The layoffs are highly concentrated in particular parts of the economy, particularly in small firms. The majority of workers laid off located a new job with little or no unemployment often experiencing wage increases. A significant minority, however, were unemployed for a year or more and /or took large wage cuts. There was tremendous heterogeneity in the post-displacement outcomes for workers.

Keywords: Unemployment, Displaced workers, Layoffs, Structural Change, Labour Market

I. Introduction

Interest in labour turnover, and especially in permanent layoffs, is increasing for a number of reasons: (1) industrial restructuring and employers' moves to reduce their costs and to improve competitiveness may be increasing permanent layoffs; (2) international comparisons indicate very high rates for labour turnover in North America, as compared to those being experienced elsewhere by competitors; and (3) worker displacement, resulting from continental trade agreements and other policies, attracts much discussion and indicates the need for a better understanding of the processes of worker displacement and permanent layoffs.

Such understanding is needed to develop public policy responses to the issue of worker displacement and subsequent adjustment. It is considered a public policy issue because of essentially three ideas. First, the burden of labour adjustment and its related costs should be more equitably distributed among the population (that is, not borne solely by workers losing jobs), since society in general benefits from restructuring in the economy. Second, labour market efficiency is improved by assisting workers, because labour will adjust more quickly and move to more productive segments of the economy. Third, the provision of support fosters a more positive attitude toward structural change, thereby facilitating such change and promoting efficiency, productivity and wealth in the economy.

To develop effective programs, information about the process of permanent layoffs, the type of workers likely to be displaced and their labour market experiences following job loss is needed. Such information was produced for the Labour Adjustment Task Force established by the Canadian Labour Force Development Board, and this paper is a summary of the work done for that task force.

Rather than test a particular hypothesis, the goal of this paper is to provide an empirical overview of permanent layoffs: how they vary over the business cycle, where they are concentrated in the Canadian economy, and what befell workers displaced from their jobs in the late 1980s.

Permanent layoffs are not as cyclically sensitive as might be expected. For example, in 1982 the Canadian gross domestic product (GDP) fell by 3.2%, overall employment declined by 3.5%, and the unemployment rate rose to 11%. During this year of poor economic performance, 1.2 million workers were laid off permanently. In 1988, GDP expanded by 4.7%, employment increased by 3.2%, and the unemployment rate was 7.8%, yet during this strongly expansionary period, over one million workers were laid off. Clearly, permanent layoffs on such a scale are a persistent characteristic of the Canadian economy.

This may not be surprising, as permanent layoffs are caused by a number of processes, many of which would result in layoffs even during expansionary periods. These would include:

(1) The Job Matching Process

Individuals seeking jobs and firms seeking workers create matches which may or may not be in the best interest of both parties. As workers learn more about the firm, and vice-versa, the match is either continued or terminated. The worker terminates the match through a quit, the firm may turn to permanent layoffs. Permanent layoffs triggered by this process would be occurring continuously, both in recessions and expansionary periods. They may be more common during expansions as hiring increases. Also, they would tend to involve workers who have been with the firm a relatively short period of time (as will be seen, most laid-off workers are in this category).

(2) The Continuous Reallocation of Market Share and Labour Demand Among Firms.

Within a given market or industry, some firms will be more successful than others; some increase their market share while others are losing. This process has been documented in the job loss and gain literature discussed later. This will lead to permanent layoffs in some firms and hiring in others. This process is going on continuously, and will occur even if overall labour demand and total employment in a market or industry does not change, or is increasing.

(3) Structural Decline in Some Industries.

Some industries are undergoing long-term decline in labour demand, because of: (1) changing international trade patterns (2) decreases in final domestic demand for the industries' products; (3) technological change. This will result in permanent layoffs in firms within the sector. Such structural decline is long lasting, and will tend to be focused in particular industries, primarily in the goods-producing sector in the recent past.

(4) Decreases in Aggregate Demand.
Decreases in aggregate demand will lead to permanent layoffs economy-wide, although this may often be more concentrated in the goods sector than elsewhere. Layoffs stemming from this process will obviously be greater in recessions, and virtually non-existent in expansionary periods such as 1988, the reference year for much of the analysis in this paper.

It is beyond the scope of this paper to assess the significance of each, but it is clear that the causes can be many. They result in a significant volume of permanent layoffs on a continuous basis.

A knowledge of the volume of layoffs in different phases of the cycle is important. But to better understand the process at least two additional pieces of information are necessary. First, where are the permanent layoffs concentrated in the economy, and what types of workers are laid-off. Secondly, given such a large volume of layoffs, even during expansionary periods, do workers adjust and find new employment readily as one might expect in an expansion? Or are there many who experience labour market difficulties? And how different are the adjustment experiences of individuals between the early 1980s - dominated by the recession - and the 1988-89 period of strong expansion? Thus, three issues are addressed in the paper : cyclical variation, where layoffs are concentrated, and labour market experiences following the layoff.

Background

The dynamic nature of the labour market, a process of which permanent layoffs are a part, can be explored by alternatively considering gross flow of workers between labour force states

(employed, unemployed, not-in-the-labour force), job losses and gains at the company or establishment level, and worker turnover (quits, layoffs, hiring) at the firm level. Gross Flows have recently been used in both Canada (Jones, 1992; Corak, 1991) and the U.S. (Blanchard and Diamond, 1990) to explore cyclical or seasonal variations in flows between various labour-market states. Patterns in longitudinal microdata on job losses and gains for manufacturing establishments during the 1970s and 80s have been presented by Baldwin and Gorecki (1990) in Canada, Davis and Haltiwanger (1990) in the U.S., and by Baldwin, Dunne and Haltiwanger (1992) for both countries. Until recently, there were few Canadian data on worker turnover at the company level. Robertson (1987) used administrative information to document the volume, nature, and characteristics of turnover, while Picot and Baldwin (1990) explored several issues related to turnover. Information from the Labour Market Activity Survey (LMAS) on quits, layoffs and adjustment have been assessed by Abbott, Beach and Kaliski (1989) and by Gera and Rahman (1991).

Theories of labour turnover have been put forth by various authors including Parsons (1977), where human capital notions play a major role. Firms invest in employees, and as specific human capital increases, the probability of a quit or layoff decreases because the firm compensates for this increase in knowledge. Jovanovic (1979), developed a "job-matching" theory. Faced with an early lack of knowledge regarding the other side of the match, workers may quit or firms may lay them off as information is acquired. As the match develops, the probability of separation declines. Numerous other authors have written on these and related theories, including Salant (1977), Mincer and Jovanovic, (1981), Hall and Lezear (1990), and McLaughlin (1991).

Data Sources & Definitions

Two main data sources are used in this paper. The first is a relatively new and unused source of data on quits, layoffs and other types of separations from firms for the 1978-88 period. This Longitudinal Worker File (LWF) has been constructed using administrative data from Employment and Immigration and Revenue Canada, and has been developed in the Business and

Labour Market Analysis Group of Statistics Canada. The second data source is the Labour Market Activity Survey (LMAS), a three year longitudinal file covering the 1988-90 period developed by Statistics Canada. For further details see Picot & Pyper (1992).

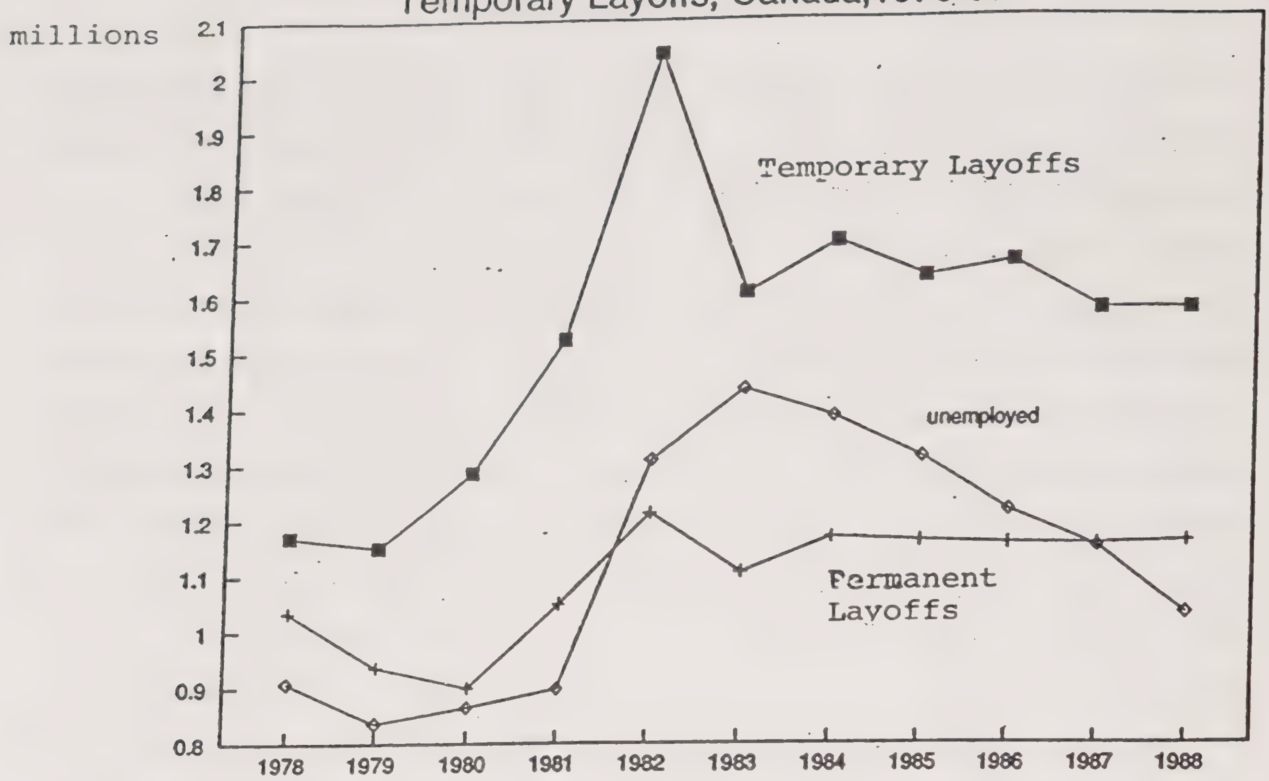
A permanent layoff occurs in the LMAS when the employee is laid off (i.e. a separation because of shortage of work, company moving or going out of business, or layoff for other reasons) and does not return to the same company in the following twelve months. In the LWF, a permanent layoff occurs when the worker separates due to a shortage of work and does not return to the firm the same or following year. Otherwise, the layoff is temporary. See "Worker Turnover in the Canadian Economy", catalogue #71-539, Statistics Canada, for more detail.

II The Cyclical Sensitivity of Permanent and Temporary Layoffs

In Canada, gross flows (Jones 1992, Corak 1992) show that the probability of a worker leaving employment rose, and the probability of entering employment (from unemployment) fell during the recession of the early 1980s. This is associated with an increase in job losses in many companies, and a decline in the number of companies with an expansion in employment (Baldwin and Gorecki, 1990). Such developments might lead one to believe that permanent layoffs and worker displacement increase dramatically during a recession. This is not inevitable, however, since temporary layoffs also influence the employment-unemployment (EU) flows. Charts 1 to 4 illustrate aggregate labour-market developments in the economy between 1978 and 1988. The number of permanent layoffs[1] rose between 1979 and 1982 by about 30%, from 0.9 to 1.2 million (chart 1), while the number of temporary layoffs, rose fully 77%. Three quarters of the increase in the number of layoffs between 1979 and 1982 (the peak of the layoffs), were temporary. This very large rise in temporary layoffs was heavily concentrated in the manufacturing sector, which alone accounted for 56% of the increase in temporary layoffs between the two years. Following the 1982 peak the number of permanent layoffs remained at around 1.1 million to 1988, in spite of strong economic recovery and expansion. Temporary layoffs fell 20% in 1983, and they too remained level through the recovery and expansionary

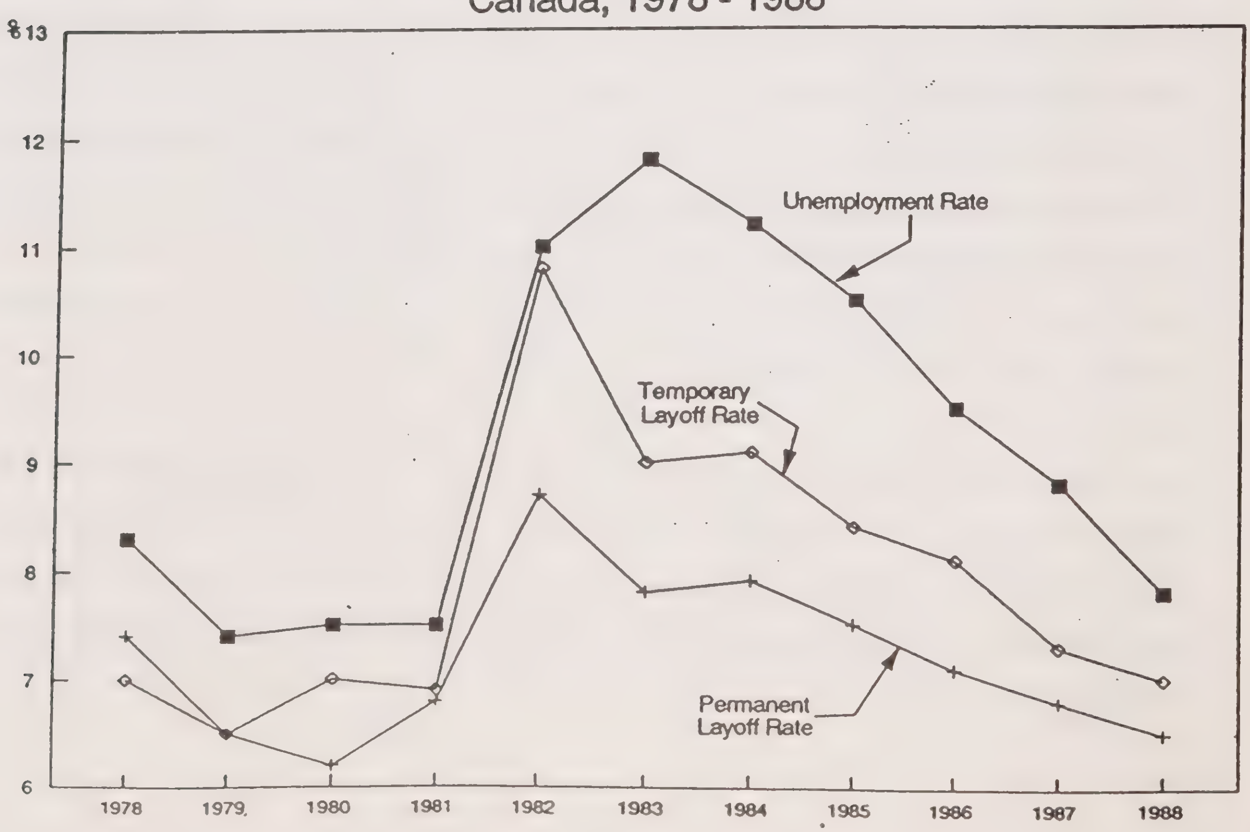
Chart 1 -2

Chart 1: Number of Permanent and Temporary Layoffs, Canada, 1978-88



SOURCE: Worker Turnover in the Canadian Economy, Statistics Canada Catalogue #71-539

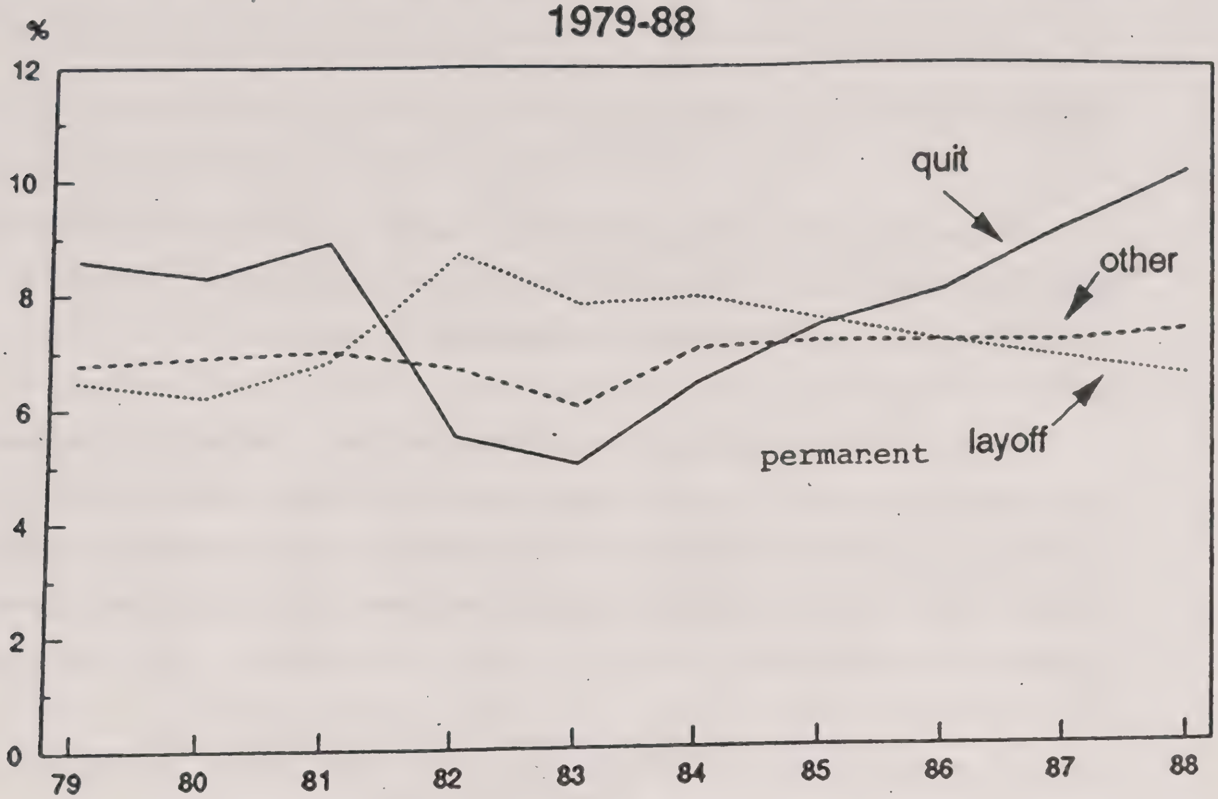
Chart 2: Layoff Rates and Unemployment Rates, Canada, 1978 - 1988



SOURCE: Worker Turnover in the Canadian Economy, Statistics Canada Catalogue #71-539

Chart 3: **Quit and Other Permanent Separation Rates**

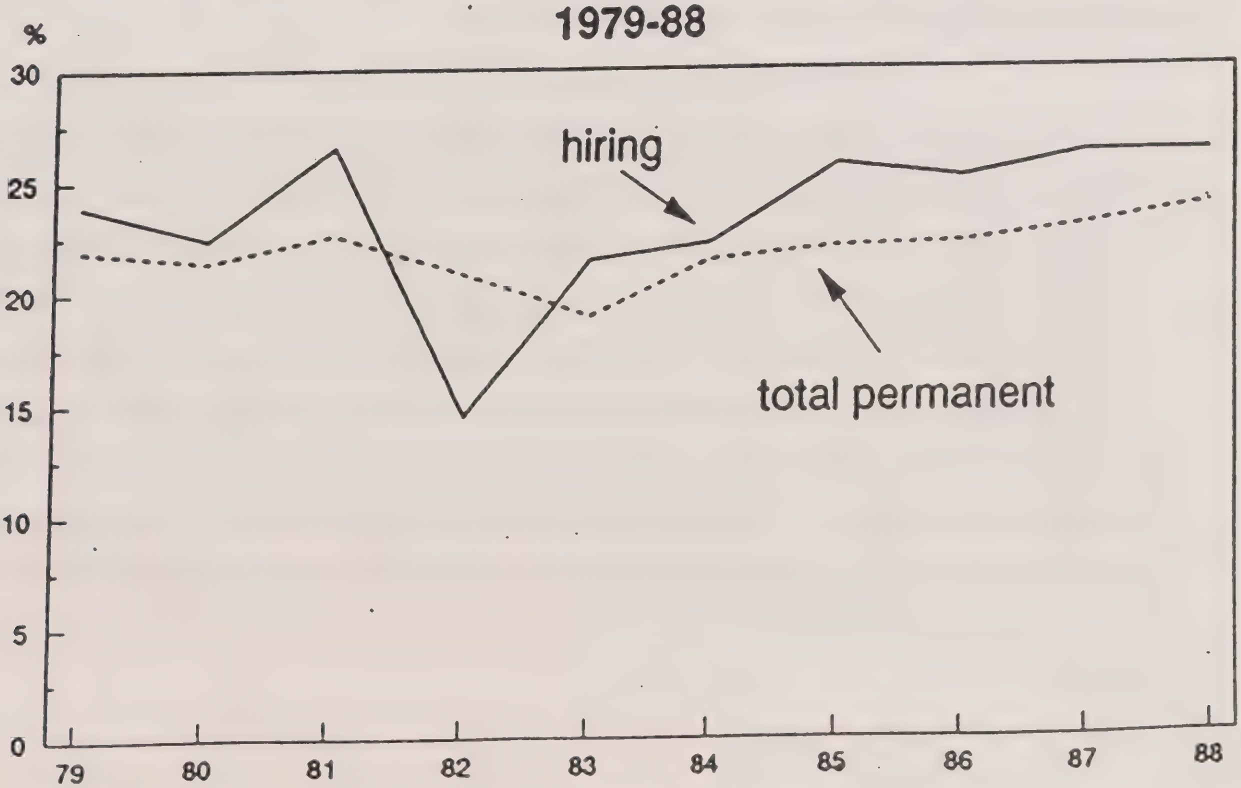
1979-88



SOURCE: Worker Turnover in the Canadian Economy, Statistics Canada Catalogue #71-539

Chart 4: **Hiring and Total Permanent Separation Rates**

1979-88



SOURCE: Worker Turnover in the Canadian Economy, Statistics Canada Catalogue #71-539

period.

Comparisons of layoff <u>rates</u> demonstrate a similar pattern (chart 2); the permanent layoff rate[2] rose one-third between 1979 and 1982, while the temporary layoff rate[3] rose by two-thirds. Both rates decline slowly to their pre-recession level by 1988.

Sector differences in this pattern are evident in table 1. The rise in the temporary layoff rate exceeds that of the permanent layoff rate in the primary industries and construction, manufacturing and the distributive services sector (transportation, communication and wholesale trade). In the business, consumer and public services sector, this strong preference for temporary layoffs was not observed.

Table 1: Change in Permanent and Temporary Layoff Rates by Industry, selected years

	Total	Primary & Construction	Manufacturing	Distributive Services	Business Services	Consumer Services	Public Services
PERMANENT LAYOFF RATES							
Change							
79-82	2.2 (34%)	6.0 (30%)	3.8 (64%)	2.5 (56%)	2.8 (72%)	1.5 (25%)	0.0 (0%)
82-88	-2.2 (-25%)	-3.6 (-14%)	-3.7 (-38%)	-2.3 (-33%)	-2.2 (-33%)	-2.3 (-31%)	-0.1 (-4%)
TEMPORARY LAYOFF RATES							
Change							
79-82	4.3 (66%)	7.7 (54%)	12.3 (118%)	4.2 (88%)	1.7 (74%)	2.0 (57%)	0.8 (16%)
82-88	-3.8 (-35%)	-3.0 (-14.0%)	-12.4 (-55%)	-3.4 (-38%)	-1.0 (-25%)	-1.9 (-35%)	0.1 (2%)

( ) Numbers in brackets indicate percentage change in the rate.

Clearly downsizing during a recession need not only involve layoffs. Firms can use attrition (quits or separations for other reasons such as illness, retirement, etc.) or cutbacks in hirings. Both the quit and hiring rates fell by 50% during the 1981-82 recession; they are strongly cyclically sensitive. Using the unemployment rate as an indicator of the business cycle trend, simple regressions of the quit, hiring, temporary and permanent layoff rates on the unemployment rates for 1978-1988 indicated that a one percentage point increase in the unemployment rate led to: (1) a 0.80 percentage point decline in the quit rate, (2) a 1.1 point decline in the hiring rate, (3) a 0.65 point rise in the temporary layoff rate, and (4) only a 0.38 point increase in the permanent layoff rate. Three rates were quite cyclically sensitive and played

a major role in firms adjusting to downsizing during the recession. The permanent layoff rate, however, was not as responsive to changes in the unemployment rate[4].

The more rapid rise in the temporary rather than permanent layoffs[5] during the recession suggests that the cyclical increase in the probability of the EU transition was related primarily to a rise in temporary layoffs[6]. Similarly, the increase in the UE flow following a recession would involve both a return by workers to their firm, and an increase in new hires.

But why do permanent layoffs remain relatively high, even during expansionary periods. It may be that the job-matching process leads to significant numbers of quits (on the workers part) and layoffs (on the employers part) as some matches turn out not to be beneficial to the worker or firm. A significant volume of layoffs are no doubt the result of the birth/death and expansion/contraction process of firms within an industry. This competitive process reallocates demand and labour among firms, leading to a significant volume of permanent layoffs and hirings. This process is occurring continuously, not just during recessions.

Exploring the concentration of permanent layoffs in 1988, an expansionary year, develops this notion further, as well as shedding more light on the layoff process.

III Who is Laid Off: Concentration of Permanent Layoffs in 1988

Employment declines in many firms, even during an expansionary year like 1988, were substantial.. Losses in companies that were in decline or disappeared in 1988 amounted to 11% of total employment in the commercial sector of the economy (excluding government, education and health) ... roughly 1 million jobs. Such a volume of job loss leads to many permanent layoffs, even though aggregate economic growth was strong. Total employment rose 3.2%, since job gain in expanding firms outstripped job loss in declining firms. Layoffs are likely to be concentrated where employment contraction and expansion (i.e. volatility) at the firm level is the greatest. This is not necessarily where net employment change for the industry is negative or low. The highest permanent layoff rate was registered in construction - the industry with one of the highest rates of employment growth in 1988 at 7.8% (table 2). There is not a statistically

significant correlation between the permanent layoff rate and net employment growth across the fourteen industries in table 2 (coefficient of .63 (t = 1.1) in regression of permanent layoff rate on net employment growth). In the cross-section, knowledge of net employment change in an industry tells one little about the incidence of permanent layoffs expected. There are underlying characteristics of industries - other than their growth rate - that determine to a great extent their level of permanent layoffs.

Permanent layoffs are highest in construction, forestry and mining.

Permanent layoffs vary considerably from industry to industry. In construction, 1 in 5 persons experienced a permanent layoff in 1988, in forestry and mining 1 in 6, while in utilities, the figure was only 1 in 75 (Table 2).

In construction, employment loss in declining or disappearing firms was high, amounting to 17.5% of employment in the industry that year (although for the industry as a whole employment grew); in utilities, it was only 1.6%. But employment declines don't necessarily lead to permanent layoffs. They can be handled by retirement and voluntary quits (attrition) or permanent layoffs. Another reason for the difference in the permanent layoff rate is the way industries manage their workforce levels. In construction, where wages are relatively high and work is highly seasonal and cyclical, quit rates are low, resulting in employers downsizing through permanent layoffs rather than through attrition. In an industry such as real estate, generally quit rates are high, allowing much of the labour reallocation process to occur through attrition. As a result, the layoff rate in that industry was less than 4% in 1988, even though many firms had substantial employment declines; the job loss rate was 15%.

Permanent layoffs are concentrated in small firms.

Firm size is another important dimension. When layoffs are discussed in the media, the image presented is often one of major cutbacks in large firms leading to worker displacement: a large manufacturer of farm equipment cuts back its workforce by letting hundreds of workers go, a major automobile manufacturer closes a number of plants displacing many workers, or one of the large airlines permanently lays off a significant proportion of its workforce to cut costs.

Table 2: Job Loss and Permanent Layoff Rate by Industry, 1988

	Job Loss Rate* Due to:			Permanent Layoffs			Net Employment Growth
	Disappearance of companies	Firms with declining employment	Total job loss	Permanent layoff rate	Distribution of permanent layoffs	Distribution of total employment	1987-88
	%	%	%	%	%	%	
Total Commercial Economy	2.9	8.1	11.0	7.9	84.7	74.7	3.5
Forestry/Mining	2.0	7.0	9.0	15.5	5.4	2.7	3.8
Manufacturing	1.8	6.8	7.9	6.0	15.1	21.2	4.3
Construction	4.1	13.2	17.5	21.5	18.2	5.4	7.8
Transportation	2.3	6.0	8.3	5.6	2.8	4.2	-0.2
Communication	0.7	0.6	1.3	2.2	0.7	2.8	-1.3
Utilities	0.6	1.0	1.6	1.4	0.2	1.5	8.7
Wholesale trade	2.3	8.6	10.9	5.9	3.7	4.9	3.9
Finance	1.7	5.0	6.7	1.4	0.5	3.2	5.1
Insurance	0.4	2.0	2.4	4.6	0.8	1.4	2.5
Real estate	3.3	12.0	15.3	3.8	0.8	1.6	4.1
Business mgt	3.3	9.5	12.8	6.2	4.3	4.7	9.4
Retail trade	2.9	6.7	9.6	7.4	14.6	11.6	3.2
Consumer Service	4.7	10.9	15.6	8.9	17.4	9.4	1.2
Health				2.8	3.4	8.6	
Education				3.9	4.3	8.4	
Public administration				7.1	7.6	8.4	
Total All Industries				7.1	100.0	100.0	

SOURCE: Longitudinal Employment Analysis Program (LEAP), Business and Labour Market Analysis Group

SOURCE: Labour Market Activity Survey

* Job loss is simply the negative employment change in a company between 1987 and 1988. A company is a legal entity. The job loss in an industry is the sum of employment change across all firms that disappeared or had declining employment between the two years in that industry. The job loss rate is the job loss divided by total employment in the industry during the base year (here 1987).

Such stories lead to an image of significant job loss in large firms. Reality, however, does not conform to this image, at least not during the 1980s.

It was from small- and medium-size firms that most of the permanent layoffs emanated. In 1988, small firms (those with less than 20 employees) accounted for 20% of employment but for 41% of permanent layoffs. Firms with over 500 employees had 40% of employment, and only 17% of permanent layoffs (Table 3). About 1 in 8 persons in small firms were laid off permanently in 1988, compared with only 1 in 29 in large firms[7].

A number of explanations are possible. The first relates to the industrial distribution of large and small firms. If small firms were concentrated in industries with volatile employment patterns due to rapidly shifting patterns of demand and high layoff rates, then naturally one would observe higher rates among small firms. This would primarily be a characteristic of the industry rather than of the size of the firm. But the firm size differentials in layoff rates are observed in all major industries (Chart 6). This is confirmed in the multivariate analysis which follows.

Table 3
Permanent layoffs by firm size and wage rate, 1988

	Permanent layoff rate	Distribution of permanent layoffs	Distribution of total employment*
	%	%	%
Firm size			
Total economy	7.1	100.0	100.0
1-19 employees	12.0	41.4	19.9
20-99 employees	7.6	17.0	15.6
100-499 employees	5.7	9.7	13.0
500 employees or more	3.4	16.6	40.0
Size unknown	8.4	15.2	11.6

Source: Labour Market Activity Survey
* *This is the number of hours of employment observed in a particular group (for example, small firms) as a percentage of all hours of employment in the economy for 1988. A part-time job has a lower weight in this calculation than a full-time job.*

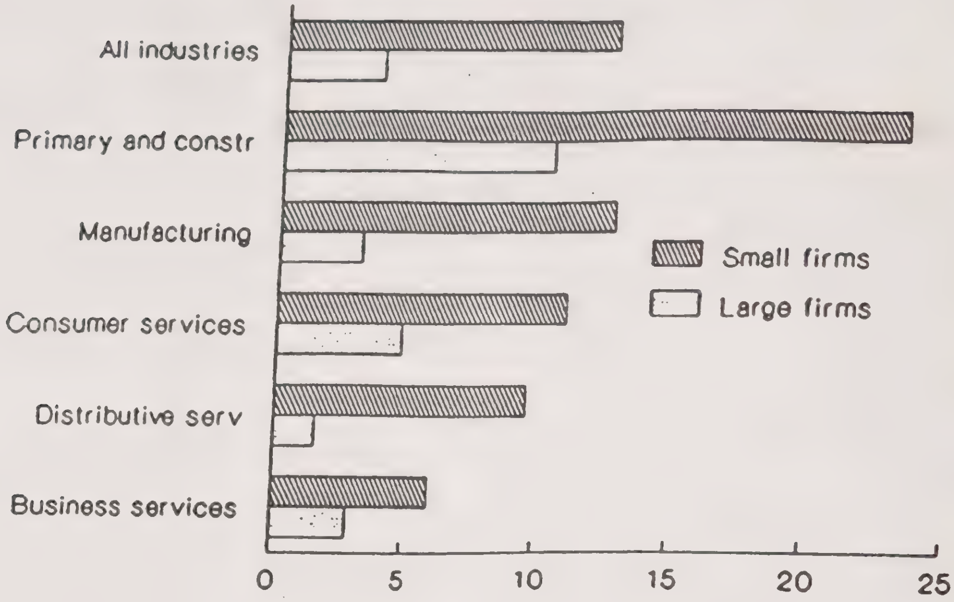
Table 4
Rate of employment loss and gain by size of firm, 1988

Firm size	Rate of employment loss due to:			Rate of employment gain due to:		
	Total employment loss rate	Disappearance of companies	Companies with declining employment	Total employment gain rate	Appearance of companies	Companies with expanding employment
Total*	10.8	2.8	8.0	13.9	2.8	11.1
Less than 20 employees	16.9	5.3	11.6	26.5	6.5	20.0
20-99	12.5	3.0	9.5	16.6	3.6	13.1
100-499	11.8	3.1	8.8	12.6	2.3	10.3
500 or more	5.6	0.9	4.7	5.3	0.3	5.0

Source: *Longitudinal Employment Analysis Program (LEAP)*
* *Private commercial sector only for 1988-89. Excludes health, education and government.*

Chart 6:

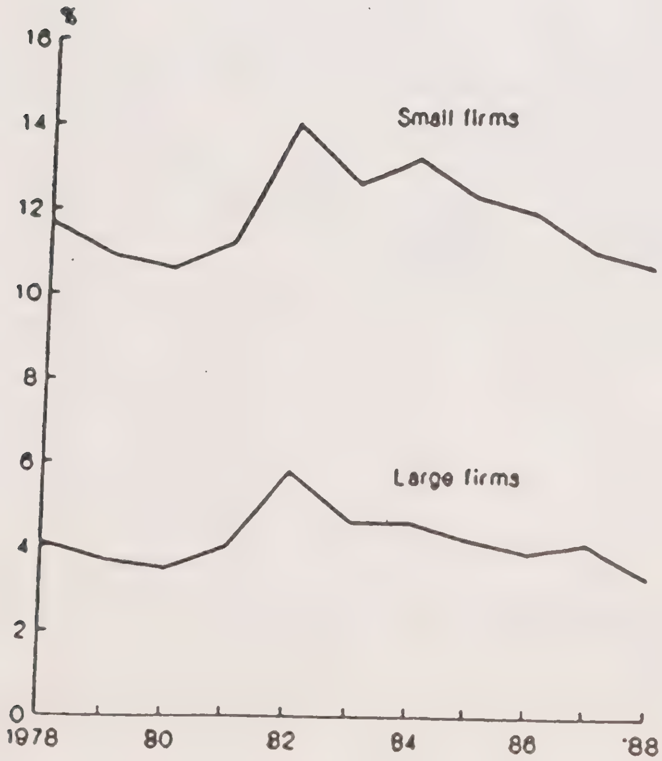
Permanent Layoff Rate by Industry and Firm Size, 1988



Source: Worker Turnover in the Canadian Economy, Statistics Canada Catalogue #71-539

Chart 7:

Permanent Layoff Rate by Firm Size, 1978-88



Source: Worker Turnover in the Canadian Economy, Statistics Canada Catalogue #71-539

The second possible explanation involves differences in the characteristics of workers employed in small and large firms. Workers in large firms have, on average, a higher level of education, are members of a union and are older and more experienced than their counterparts in small firms (Morissette, 1991). All of these characteristics are associated with lower permanent layoff rates. A logistic regression was used to estimate the probability of permanent layoff as a function of firm size and a number of other worker characteristics, including age, education, wage rate, union status, industry and occupation (appendix table 1). To be able to better interpret the results, relative probabilities were calculated for each variable and reported in table 5. The results indicate that the probability of being laid off in a small firm as opposed to a large firm falls when controlling for worker characteristics, from roughly 4:1 (in the raw data) to 2:1 (in the logistic regression), but does not disappear.

A third possible explanation relates to the stability of small and large firms. The small firm sector is highly volatile; companies are much more likely to disappear and be replaced by others, obviously affecting layoffs. In 1988, among small firms, employment fell 5.3% due to the disappearance of companies and an additional 11.6% due to workforce downsizing in declining (but continuing) firms. Thus, 16.9% of total employment in small firms was lost in declining or disappearing firms (Table 4). Among large firms, only 5.6% of total large firm employment was lost in declining or disappearing companies (0.9% in disappearing firms and 4.7% in declining). With a rate of employment loss three times higher than that of large firms, it is not surprising that small firms could have four times the permanent layoff rate.

The difference between the layoff rate in small and large firms persists over the course of the business cycle. During the 1980s, the likelihood of being displaced (permanently laid off) from a large firm, even during a severe recession like that of 1981-82, does not approach the probability of being laid off from a small firm during the best of economic times (Chart 7). Whether this pattern persisted during the 1990-91 recession remains to be seen.

These results are consistent with the idea that for a particular worker overall economic conditions are not the most important factor in the worker displacement and permanent layoff

process; other factors such as the amount of reallocation of market share among firms within a given industry or sector, or the impact of structural change may be more significant.

Laid-off Workers Tend to Have Very Short Job Tenure, Lower Wages, Less Education and are Young

The vast majority of permanently laid-off worker in 1988 had been with their firm less than two years. The Labour Market Activity Survey data suggests 68% of the displaced workers had started with the firm in 1988 (compared to 34% of all full-time workers), and three-quarters had joined their employer in 1987 or 1988. A second independent data source, the Longitudinal Worker File, suggests 77% of workers displaced in 1988 joined their firm in that or the previous year. The last-in first-out policies in place in many organizations, may account for part of this, as may the outcome of the "job-matching" process. Very few workers with job tenure of three years or longer were laid-off during the 1988 expansionary period. Workers starting their job in 1985 or earlier represented 45% of full-time workers in 1988, but only 11% of laid off workers. Earlier work (Picot and Wannell, 1987) also suggests that during the 1981-84 period, dominated by the recession, the layoff rate was much higher among those with shorter job tenure.

The other characteristics associated with higher probabilities of permanent layoff are youth (they are 1.6 times as likely to have been laid off as workers in general in 1988), less than a high school graduation (1.4 to 1.6 times as likely) and persons receiving $8.00/hour or less, who were 1.6 times as likely to be laid off as displaced workers as a whole (table 6). Many of these characteristics are correlated, and simultaneously assessing the relationship with the probability of layoff significantly reduces their effect, as shown in the logistic regression results in table 5.

IV The Resolution of the Permanent Layoff

The large number of permanent layoffs during an expansionary year like 1988, along with a large volume of quits and other separations suggests a potentially very high degree of labour market flexibility and intra-firm mobility. But the incidence of separations from firms alone is not sufficient basis on which to suggest the labour market is "flexible". Once in the open labour market, how difficult is it for workers to locate new jobs? During expansionary periods, with

Table 5

Relative probability of permanent layoff in 1988, as calculated from the logistic regression model

Category	Relative probability	Category	Relative probability
Age (probability of permanent layoff compared with that for 16-24 year-olds controlling for the effects of other variables listed)		**Firm size** (relative to 500 and more)	
16-24	1.0	Less than 20	2.1
25-34	0.8	20-99	1.6
35-44	0.7	100-499	1.4
45-54	0.7	500 or more	1.0
55-64	0.8	Unknown	1.7
Education (relative to university)		**Hourly wage rate** (relative to $25 per hour)	
Elementary	1.2	$ 5	1.7
High school	1.1*	$10	1.5
Some post-secondary	0.9*	$15	1.3
College certificate or diploma	1.0*	$20	1.1
University	1.0	$25	1.0
Industry (relative to business services)		**Occupation** (relative to managers)	
Forestry and mining	2.3	Managers	1.0
Construction	2.6	Natural and social sciences	1.1*
Manufacturing	1.0*	Clerical	1.6
Distributive services	0.9*	Sales	1.3
Business services	1.0	Services	1.3
Consumer services	1.2	Primary, processing and fabricating	2.4
Public services	1.2	Construction	2.7
		Other	1.7

Source: Labour Market Activity Survey

Note: *The relative probability is simply the probability in a level compared to a reference level. The probability of permanent layoff for any particular variable (for example, different levels of age) is calculated at the mean value for all other variables. When another variable is discrete (such as education, which has five discrete levels), the weighted average is used, where the weights are the proportion of all workers in each level of the variable.*

* *Not significantly different from 1.0 at the 5% level.*

Table 6. **Hazard Rates[a] and Percentage Distribution of Workers Permanently Laid Off from Full-time Jobs, 1988**

	Number		Hazard ratio
	'000	%	
Total	832	100.0	1.0
Wage Rate			
< $8.00	365	43.9	1.6
$8.00 - $13.49	302	36.3	0.9
> $13.50	164	19.7	0.6
Age Group			
16-24	304	36.6	1.6
25-34	248	29.8	0.9
35-44	141	16.9	0.7
45-54	85	10.2	0.7
55-64	51	6.1	0.9
65-69	3	0.3	0.6
Education			
0-8 Years	103	12.4	1.6
Some H.S.	241	29.0	1.4
Graduated H.S.	203	24.4	1.0
Some Postsec.	95	11.4	0.9
Postsec cert/dipl	128	15.4	0.9
Univ	61	7.4	0.5

Source: Labour Market Activity Survey

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relatively low unemployment (although it was 7.8% even during 1988) one might expect that the reallocation of labour would be a smooth process. Of course, the adjustment process will be easier for some workers than others, with the familiar traits of education, employment history, and age influencing the outcome. Because of the paucity of longitudinal labour market data, little is know about the adjustment process of displaced workers. There have been special studies, but little data on the process in the labour market as a whole is available. What follows is a summary of the findings; the detail can be found in Picot & Pyper (1992). This section is divided into two parts; employment and unemployment experiences, and wage change following layoff.

Employment and Unemployment

The labour force experiences of workers permanently laid-off from full-time jobs in 1988 are the focus of this section. A summary of the findings includes the following:

- A large number found themselves without full-time jobs following the layoff. Seventy-two percent found a new full-time job at some time during the following 12 months, but many subsequently lost them. As of one year following the lay-off, 64% had a job, either full-time or part-time (Table 7). Many, however, left the labour force. Twenty-two percent were not in the labour force one year after the layoff.

- However, the majority of displaced workers found new jobs with little or no unemployment[9]. Over one-half (53%) of the workers experienced less than three weeks unemployment, and 22% had between 4 and 13 weeks. There were however, a significant number of workers (12% or 91,000) who, following permanent layoff, were unemployed more than one-half of the time during the following year, even during a period of rapid economic growth. Workers of all types could be found among this group... the young, old, less educated, post-secondary graduates, men, women, etc. Generally, however, unemployment duration was longer among older workers, and those with less education, results which are well known.

- The unemployment rate among displaced workers one year after layoff was quite high at 17.6%. Even among the workers with stable jobs prior to the layoff (two years or more with the firm), the unemployment rate was 13.6% one year after the job loss.

- The unemployment rate may be higher among displaced workers simply because there are large numbers who have characteristics associated with high unemployment (e.g. little education). Standardizing for the differences in the age, sex and educational composition between the labour force as a whole and those of the displaced workers made very little difference. The standardized unemployment rate one year after layoff is no more than one percentage point different from the non-standardized rate of 17.6%, depending on which variable is used in the standardization[10]. It is not compositional differences (in age, sex or education) that account for this higher unemployment rate.

- By tracking the permanently laid-off workers through the year after job loss, it is possible to observe how the unemployment rate among that group declines as jobs are found (Chart 8). Four weeks after layoff, almost one-half of these workers still in the labour force are unemployed. This declines steadily to around 18% by the 45th week. Although one would like to have a longer period than a year, this may be the more or less asymptotic unemployment rate (i.e. its long-term level) for these particular workers during an expansionary period. This implies that there are particular characteristics, mostly unmeasured, of these workers that keep the rate high, even during a period of economic growth.

Stable employment eludes some of these workers. The short job tenure in the lost job was noted earlier. Other evidence indicates that some workers experience repeated permanent layoffs. Ten percent of workers laid off in 1978-79 were laid off an average of six times in the following seven years. Even among workers with some evidence of a stable work history (more than two years in the lost job) the unemployment rate was 14% one year following layoff. While most displaced workers experienced little or no unemployment, a significant minority did not adjust smoothly. The data in Table 7 suggest education level played a major role in this process,

Table 7: LABOUR FORCE STATUS OF DISPLACED WORKERS ONE YEAR FOLLOWING THE PERMANENT LAYOFF, persons laid-off from full-time jobs in 1988

	Employed %	Unemployed %	Unemployment Rate %	Not in Labour force %	Total Number (Thousand)
All workers	64.4	13.8	17.6	21.8	831.8
Males	66.5	14.2	17.6	19.3	546.1
Females	60.6	13.0	17.6	26.4	285.7
Agric/Fishing	63.8	16.3	20.4	19.9	47.7
Forestry/Mining	57.5	18.1	23.9	24.5	50.5
Construction	65.4	17.0	20.6	17.7	168.9
Manufacturing	66.3	10.4	13.6	23.3	144.8
Distr. Services	57.3	13.1	18.6	29.7	62.1
Bus. Services	68.2	13.5	16.5	18.3	49.9
Consumer Serv.	65.8	11.0	14.3	23.2	207.7
Public Serv.	63.8	16.3	20.4	19.8	100.1
16-24	65.6	11.1	14.5	23.3	304.4
25-34	66.4	17.7	21.1	15.9	248.2
35-44	60.1	14.5	19.5	25.3	140.7
45-54	69.6	13.6	16.3	16.8	84.5
55-64	53.9	9.6	15.1	36.5	51.1
0-8 years	52.3	14.5	21.7	33.2	103.2
Some H.S.	63.2	15.0	19.2	21.8	241.0
Completed H.S.	63.8	14.5	18.6	21.7	203.1
Some P.S.	68.9	13.5	16.3	17.6	95.1
Post-Sec Cert/Dipl.	68.1	12.4	15.4	19.5	128.0
University	77.5	8.9	10.3	13.5	61.4
Person in the Last Job Two Years or Longer	69.6	11.0	13.6	19.5	109.0

Source: Labour Market Activity Survey

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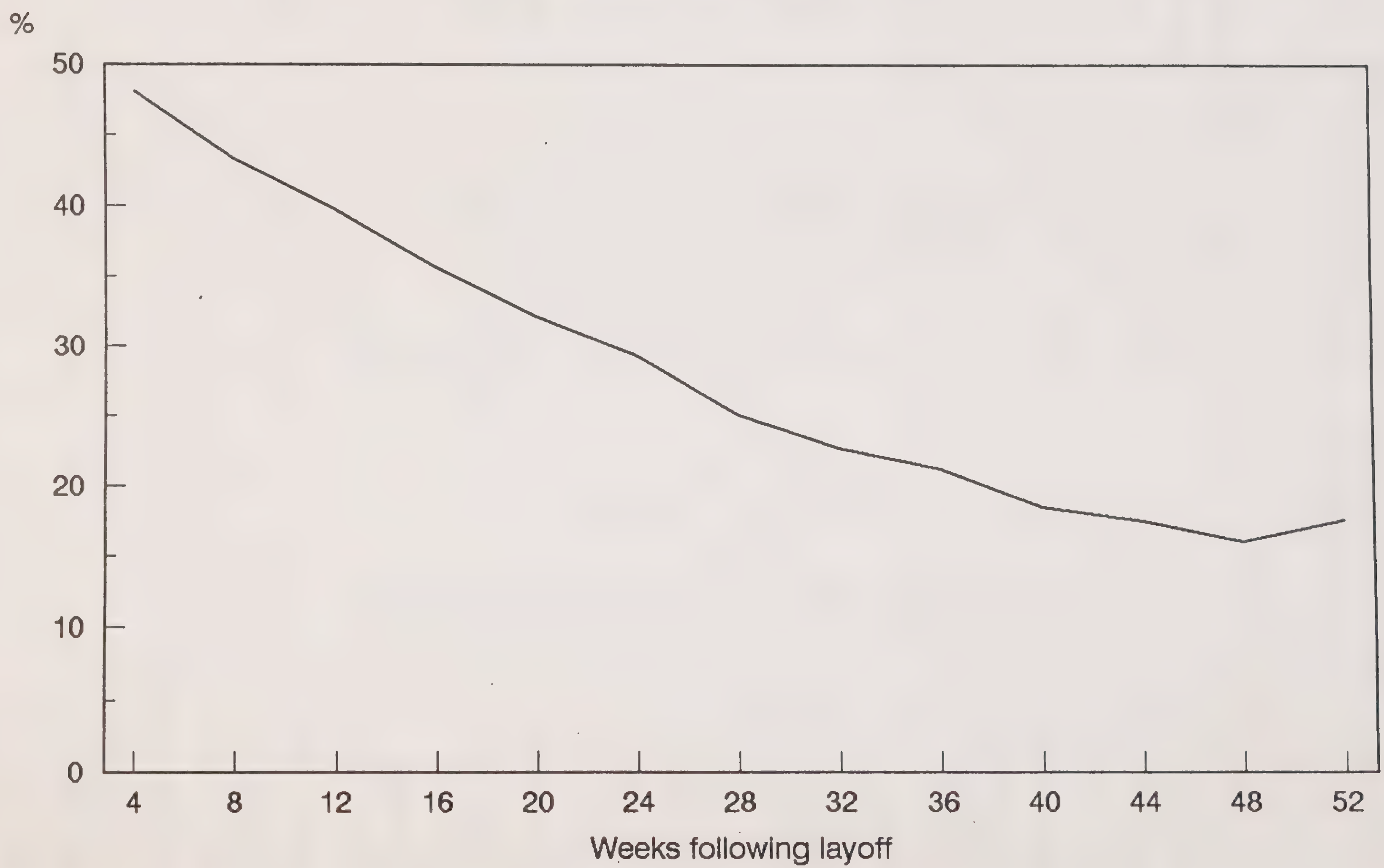
Chart 8: Unemployment Rate by Weeks Following Permanent Layoff



as the unemployment rate one year after layoff rises from 10% to 22% between the elementary and university educated workers.

Wage Change Following Permanent Layoff

Just as there was tremendous variation in the outcome of job search, so too was there in the wage change between jobs. A number of factors can influence wage gains or loses during a job change following a layoff, including the following:

- The reservation wage of the worker may fall as unemployment duration increases, resulting in a lower wage gain (or greater wage loss).

- Workers may have firm or industry specific skills that are not marketable when a worker changes firms or industries, resulting in a lower wage gain (or wage loss).

- Wage change may be negatively correlated with age, as advancement is more likely to occur among the young, even following layoff.

- Wage change may also be negatively correlated with the wage level in the lost job simply because the higher the wage, the less likely is a very large wage gain. There is a limit to the wages most firms are willing to pay (for a given level of human capital). Similarly, for very low wage jobs large wage losses are unlikely because there is a minimum wage restriction. These considerations may lead to a regression to the mean phenomenon.

- A change in occupation may also be associated with a larger wage loss because some skills used in an earlier occupation will not necessarily be applicable to the new work.

- Education level may also be positively correlated with wage change because the premium placed on higher levels of human capital may not only influence wage levels, but also the adjustment process following job loss.

The relationship between these variables and wage loss and gain are explored in this section through the estimation of a wage change equation. However, measurement error in the wage variable can be significant in longitudinal surveys. There is reason to believe that measurement error in wage change as reported in the LMAS, while unknown, is significant. This is explored in the appendix, and should be borne in mind when interpreting the results.[11]

There was tremendous variation in the outcomes. Almost one-half of the displaced workers had a wage gain, and the median gain was 28%. Almost one-third had wage losses, the median loss -22%. The remaining 22% experienced no change (meaning a change within ±5%). As mentioned, there is some unknown amount of measurement error in these results. To determine which variables were associated with significant wage gains and losses, a regression model of the following form was used[12]

$$\ln\left(\frac{WN_i}{WL_i}\right) = B_0 + B_1 \ln WL_i + B_2 UNDUR_i + B_3 SIND_i + B_4 SOCC_i + B_5 X_i + E_i$$

where:

WN_i:	hourly wage for individual i in new full-time job
WL_i:	hourly wage for individual i in lost full-time job
$UNDUR_i$:	Weeks seeking work prior to locating new job
$SIND_i$:	both jobs in same industry = 1, otherwise 0
$SOCC_i$:	both jobs in same occupation = 1, otherwise 0
X_i:	vector of personal characteristics for individual i, including age, education, occupation, industry and region of lost job

The model was run for men and women separately. The results are in table 8. They indicate that:

- wage in the lost job is a very significant variable. Higher wages may be achieved

through the development of firm or industry specific training and experience within internal labour markets. When forced to seek employment in external labour markets, and perhaps in different industries or occupations, pay cuts may result for highly paid workers. The regression to the mean phenomenon occurs as well because low wage earners have more opportunity to increase their earnings than high wage earners, as was discussed in the introduction to this section. Measurement error may also play a role. Generally speaking a 10% increase in the hourly wage rate in the lost job was associated with a 6% decrease in the wage rate between the old and new job.

- Weeks looking for work had a small and statistically insignificant effect on wage change. For a 10 week increase in job search, the wage change fell by 1% to 2%.

- Skill level as indicated by education and occupation would be expected to influence change in wages, and it did. Having a post-secondary education increased the wage gain (or decreased the loss) by 13% to 22% as compared to workers with only elementary education. Among women, professions such as social sciences, teaching, and management gained in the order of 20% to 24% more in the job change than their counterparts in processing, fabricating, clerical and primary occupations (there was little significant difference among occupations for men). The high demand for skilled and highly educated labour influences wage gains during adjustment.

- Generally speaking, the industry of job loss had little effect on the wage gain or loss. For example, workers laid off in manufacturing did not experience any larger wage loss (or gain) than others, controlling for wage in lost job and other characteristics[13]. Adjustment for manufacturing workers during the period did not appear to be significantly different than for workers laid off in other industries, (as measured by employment/unemployment patterns and wage gain).

There is likely significant measurement error in the wage change data which would reduce the reliability of the results. They do suggest that there is tremendous variation in the wage

changes of displaced workers, and that the single most significant variable influencing the change is the wage level in the lost job. Workers in high wage jobs tend to lose, those in low wage jobs gain. There is much variation in the wage change, however, that is not captured in the model.

Comparisons with Results from the 1981-85 Period

The employment, unemployment and wage changes experienced by permanently laid-off workers during 1988-89 occurred during a period of economic expansion. How different are they from the experiences of workers laid-off during 1981-84, a period dominated by a recession. Clearly economic conditions will influence adjustment patterns.

The Displaced Workers Survey (DPW) of 1986 provided information on the labour adjustment experiences of workers who were permanently laid-off during 1981 to 1984, and adjusted during 1982-85. While this period was a mixture of economic decline (81, 82) and recovery (83 to 85), the labour market was generally depressed as unemployment remained in the 10.5% to 11.8% range over 1982-85, the adjustment period. Employment, unemployment and wage change following the job loss was the focus of the Displaced Workers survey. Basic results were reported in Picot and Wannell (1987).

Comparison of the results between the two period must be considered preliminary because: (1) the respondent recall period in the DPWS was up to five years, that in the Labour

Table 8: **Regression Model for Change in Hourly Wages Between Lost and New Full-Time Jobs**

Reference group	Variable	Men		Women	
		coeff	't'	coeff	't'
--	Intercept	1.365	7.2	1.713	8.8
--	Ln of Wage in lost job	-0.617	-11.8	-0.713	-11.6
--	Weeks unemployment	-0.002	-1.5	0.000	-0.4
New job in different industry	New job in same industry	-0.019	-0.8	-0.004	-0.1
New job in different occupation	New job in same occupation	0.071	2.4	0.023	0.7
Age 55-64	age 16-24	-0.184	-2.7	-0.234	-2.2
	25-34	-0.044	-0.7	-0.156	-1.5
	35-44	0.072	1.1	-0.131	-1.2
	45.54	0.022	0.3	-0.145	-1.3
Elementary	Some high school	0.106	2.3	0.045	0.8
	high school grad	0.098	2.0	0.067	1.2
	some post-sec	0.052	0.9	0.077	1.2
	college cert/dipl	0.166	2.9	0.128	1.9
	university	0.195	2.8	0.216	2.7
Social/Sciences	Managers	0.056	0.6	-0.015	-0.1
	Nat.Sci/engineering	0.104	0.9	0.149	1.7
	Clerical	-0.065	-0.6	-0.106	-1.5
	Sales	-0.113	-1.1	-0.105	-1.3
	Services	-0.117	-1.2	-0.060	-0.8
	Primary	-0.027	-0.3	-0.200	-2.3
	Processing	-0.044	-0.4	-0.242	-2.4
	Machining	0.100	1.0	0.271	2.3
	Fabricating	-0.097	-1.0	-0.183	-2.0
	Construction	-0.067	-0.7	-0.056	-0.4
	Transportation	-0.058	-0.5	0.188	1.6
	Crafts	-0.056	-0.3	-0.147	-1.2
	Others	-0.036	-0.3	0.335	2.1

Reference group	Variable	Men		Women	
		coeff	't'	coeff	't'
Manufacturing	agric/fishing	-0.027	-0.5	-0.011	-0.1
	forestry/mining	0.045	0.7	0.072	0.4
	construction	0.062	1.2	-0.117	-1.0
	distributive services	0.027	0.4	-0.115	-1.6
	business services	0.074	1.0	-0.016	-0.2
	consumer services	-0.012	-0.3	-0.145	-2.8
	public services	0.061	1.1	-0.156	-2.6
Prairies	Atlantic	0.010	0.3	-0.137	-3.0
	Quebec	0.122	3.8	-0.016	-0.3
	Ontario	0.036	2.2	0.018	1.1
	B.C.	0.019	2.4	0.004	0.4
Sample Size		1484		608	
Degrees of Freedom		37		37	
F		24.3		18.7	
Adjusted R^2		0.37		0.52	

Source: Labour Market Activity Survey
Note: See definitions for industry and occupation breakdowns.

Market Activity Survey (LMAS) used here only one year, which leads to an under-estimate of permanent layoffs which are followed by little or no unemployment in the DPW Survey of 1981-84. (2) the adjustment (job search) period may cover up to three or four years in the DPW Survey, and only one in LMAS, although most periods of adjustment will be under one year in both surveys. (3) different types of workers are displaced in a recession as compared to an expansionary period, affecting the overall adjustment patterns.

Bearing in mind these often significant differences in the data sources, following are some preliminary comparisons of the results for the two periods.

Table 9: Comparison of Finding the Next Job Following Permanent Layoff

	1988-89 Adjustment Period	1982-85 Adjustment Period
% finding new full-time job at some time during adjustment period	72%	72%
% employed:		
after 1 year	64%	
as of January 1986[14]		63%
unemployment rate		
after 1 year	18%	
as of January 1986[13]		24%
% with 3 weeks or less unemployment between lost & new full-time job[15]	53%	26%

These results indicate that:

(1) The percent finding new full-time jobs at some time during the period was quite similar, and in both periods many lost these jobs subsequently, as the percentage employed at a given time was fairly low in both cases (63% and 64%). This suggests many displaced workers had continuous employment problems during both these periods.

(2) The unemployment rate among this population of workers remains high in both period ... 18% after 1 year in 1989, and 24% in 1986, although finding employment was apparently more difficult during the earlier period.

(3) A smaller proportion of permanently laid off workers during the 88-89 period experienced more than 3 weeks of unemployment as one would expect, although the difference is probably over-estimated for the reasons outlined earlier.

Regarding wage change during the two periods, the result were in many ways similar. Large variation in outcomes, the hallmark of these results, is evident in both periods. The proportion of displaced workers gaining or losing wages was basically the same in the two periods. A little over half of the workers had a wage gain in the move to a new job (55% in the 81-85 period, 57% during 88-89) the remainder experienced a wage loss[16].

A wage change equation similar to that reported earlier was run for both periods. The detailed results for the 1981-84 period can be found in Picot and Wannell (1987). The results from both were quite similar in that:

(1) The wage in the lost job was the most significant variable during both periods; generally high wage workers tended to lose, and low wage workers tended to gain[17]. The possible reasons for this were discussed earlier.

(2) The industry of the lost job did not influence wage change in either period, having controlled for the other variables.

(3) Changing occupation had a significant negative influence on wage change during both period.

(4) The weeks looking for work had a very small effect on wage change during both periods

(5) Generally, having a college or university education had a positive effect on the wage change (as compared to those with elementary education), during both periods.

In spite of the differences in economic climate, there were many similarities in the results for the two periods.

There may be a number of reasons for this:

(1) In a sense both surveys covered expansionary, or at least recovery, periods. Although the unemployment rate was higher during the 1983 to 1985 period than during 1988-89, employment and GDP were expanding in both periods.

(2) Some segment of the population of displaced workers may have difficulty adjusting during any period because of, for example, mismatches between their skills, aptitudes and work habits and those required in the available jobs. If structural change leads to decreased demand for workers with particular skill sets, this would influence adjustment during both periods, above and beyond difficulties associated with a short fall in employment opportunities due to a lack of aggregate demand.

(3) A significant proportion of "displaced workers" during any period will consist of workers with chronic employment problems. Of all workers permanently laid-off in 1978 or 1979, only about one-half did not experience another permanent layoff during the following seven years. Ten percent averaged six or more permanent layoffs in seven years (about once per year on average), while another 40% had from two to four layoffs. The employment patterns following layoffs in both the early 1980s and 1988 also suggested considerable employment instability among a group of workers. Workers with repeated permanent layoffs (which exclude seasonal separations) may have serious re-employment problems, no matter what

period one is focusing on.

(4) The differences in the data sources may be contributing to similarities which, were the data sources identical, would not be observed.

Whatever the reason (with the exception of the last), these similarities suggest that labour adjustment difficulties persist for a substantial segment of permanently laid-off workers during most years.

CONCLUSION

This empirical overview of permanent layoffs during the 1980s leads to a number of results.

First, the economic forces referred to in the introduction lead to a large volume of permanent layoffs during both recessions and expansions. Over one million workers were permanently laid off each year during the 1980s. It seems likely that much of this layoff activity is associated with the dynamic economic pressures continuously faced by many firms[18] within their markets or industries. The resulting permanent layoffs are then concentrated among particular groups in the economy where volatility in labour demand at the firm level (not necessarily the industry level) is the greatest. The forestry and mining and construction industries experienced the highest permanent layoff rates. Concentration in small firms was quite pronounced, as they accounted for 41% of layoffs but only 20% of employment. Large firms played a relatively minor role in the permanent layoff process, accounting for only 17% of layoffs.

Second, a rise in temporary layoffs - combined with a large drop in hiring - played the larger role in the downsizing of firms necessary during the 1981-82 recession. While permanent layoffs increased, they did so much less than temporary layoffs. The rise in the EU flow observed in the recession resulted largely from a rise in temporary, not permanent, layoffs. Perhaps two-thirds of the additional workers moving into unemployment during the recession

returned to their employers. There is considerable speculation that permanent layoffs are much more prominent during the 1990-92 recession, perhaps due to structural changes which are occurring in manufacturing in particular. The data are not yet available to test this hypothesis.

Third, the relatively small increase in permanent layoffs, combined with the large drop in quits, resulted in fewer workers leaving their firm in the recession than during expansionary periods. Combined with the large drop in hiring, this led to the well-known decline in labour mobility during the recession. This observation is at odds with a new theory proposed by Hall (1991) which argues that worker-firm matching rises in an efficient manner during recessions.

Fourth, the permanent layoffs observed in the expansionary period are concentrated among particular types of workers. In particular, laid-off workers generally have very short job tenure; three-quarters were with their firm less than two years. This may be the result of a poor job-worker match, last-in-first-out policies, or because small firms which fail and layoff their worker generally do so in the first few years[19]. The probability of layoff is also much higher among young, low-wage workers with lower levels of education. As one would expect, it is not a general cross-section of workers who are laid-off.

But if workers smoothly adjust once in the open labour market, locating new jobs with relatively little difficulty, the volume of layoffs observed during expansions would certainly be no cause for concern. It is a reflection of the very dynamic nature of labour markets - and the growth and decline process among firms - in North America. Such resource reallocation has generally been viewed as a positive feature of these dynamic labour markets.

And for most laid-off workers, that is the way the process appears to work during most years (except perhaps recessions). The majority laid off in 1988 located a new job with little or no unemployment, and many achieve wage rate increases in the process. Many others, however, (18%) were unemployed as of one year after the layoff, and many who did locate a new job took significant pay cuts. In particular, higher wage earners often took cuts in pay, perhaps because some firm-specific skill relevant in the lost job were not of value in the open labour market.

Interestingly, industry had little effect on the results; manufacturing workers appeared to do as well or better than others in the wage gains following layoffs, in spite of the concern about workers losing high wage jobs and moving to the lower wage services sector. In general, there was tremendous variation in the experiences of individual workers following layoffs.

Finally the comparisons that were possible between the 1981-84 and 1988-89 periods suggest the differences in outcomes were not as great as one might expect, given the differences in labour market conditions. While less unemployment was observed among laid-off workers in the latter period, it was clear that all difficult adjustment experiences did not disappear simply because the economy was in an expansionary phase. Some workers did very well following layoff during both the early and later periods, while others had considerable difficulty. Persistent problems may relate to skill mismatches between the worker and most available jobs-whether in recession or expansion: The one variable which consistently influenced the outcomes - whether it was the probability of layoff, or unemployment and wage change following layoff -was education. For example, compared to the elementary educated, university grads were 20% less likely to be laid-off, if laid-off had only one-half the unemployment rate, and had a 20 percentage point higher gain in wages when locating a new job. It has long been known that education and skill level influence labour market outcomes, and it is no different for displaced workers. As firms attempt to upgrade the skill levels of their labour forces, labour demand is higher for the more highly skilled and educated, affecting these results.

These statistical results, developed as background material for a task force in labour adjustment, hold a number of implications for it. While it is not the goal of this phase of the project to identify such implications, a couple of observations can be made.

First, as noted above it is incorrect to think of permanent layoffs as being driven solely, or perhaps even predominantly, by drops in aggregate demand. Structural change obviously plays a role, but there are also other causes, including the on-going competition among firms, which lead to a significant volume of layoffs. Such a process does not likely require special adjustment assistance, as workers move from failing or contracting firm to more productive expanding firms.

This results in the concentration of displaced workers in small firms and particular industries observed earlier. Hence, the very large volume of layoffs by itself is not on indicator of a strong need for adjustment programs.

However, when taken with the observations regarding the employment/unemployment experience following the layoff, it is evident that a significant proportion of workers do experience adjustment problems. And this need does not disappear during even strong expansionary periods, such as 1988-89.

It may also be useful to think of two groups of displaced workers... those who display chronic employment instability, rendering the displacement just another among frequent separations, and those for whom the separation is a unique and unusual experience. Longitudinal data reported earlier suggest the latter category captures perhaps one-half of displaced workers, the former perhaps 10% to 15%, with the remainder falling somewhere between. The types of programs to be developed would want to distinguish between those groups, as their needs would be quite different. Employment history should be an important criteria in any adjustment program.

While certain types of workers have been documented to have higher probabilities of permanent layoff, it is unlikely that using this information in the selection of candidates for particular programs would be useful. To excluded some individuals based on these probabilities would be unreasonable, as they change with economic conditions. An understanding of the characteristics of workers who are likely to be layed off can be used in designing the programs, and anticipating the needs of persons in the programs, however.

As mentioned, there is speculation that permanent layoffs and worker displacement played a more prominent role during the 1990-92 recession than during the 1980s, due to more plant closures stemming from restructuring. While it is too early to determine if labour adjustment during the 1990s will be significantly different from that of the 1980s, it seems likely that many of the observations reported here will hold. Skills and education are likely to become more

important. The volatility in industrial markets leading to layoffs is unlikely to be reduced, and it will continue to be concentrated in particular industries and types of firms. There could be some changes regarding the difficulty of adjustment for particular workers. We will have to await new longitudinal data sources to measure adjustment in the 1990s, notably the new Survey of Labour and Income Dynamics starting in 1994, and perhaps a re-run of the Displaced Workers Survey. The latter is important because it could provide (retrospective) longitudinal data on labour market outcomes for the 1990-92 recession. Direct comparisons with the 1981-84 period could then be made to substantiate (or not) the findings reported here. Without this data source, no longitudinal data will be available for the 1990-92 period.

APPENDIX

Measurement Error in the Wage Change Estimates

When independent estimates of wage rates in two successive jobs are provided in household surveys, error in either of the responses may lead to substantial error in the change in the wage rate. The problem is that the true wage rates, and hence the true change in the wages, are hardly ever known. Determining the extent of the measurement error is difficult.

The few studies attempting this (Duncan and Hill, 1985, and Bound and Krueger, 1991) have produced mixed results. Focusing on annual earnings (rather than hourly wage rates) both papers find room for optimism. The first paper concludes that "errors of change in annual earnings were surprisingly small because of a substantial positive correlation in the reporting errors over time", and the second paper found that "fully 75% of the variation in the change in earnings represents true earning variation". This was much higher than expected. Again serial correlation played a major role in this finding. When focusing on hourly wage rates, however, the Duncan and Hill paper found much larger errors, mainly because these rates were computed from annual earnings and hours worked. Wage rates which were directly reported may have much lower error (as is the case for the majority of the responses in the LMAS).

Turning to the LMAS one calculation suggests that while unknown, the error in the wage change may be significant. Based on observations of wage changes during 1987 while with the same employer, Boothby (1991) observed that almost 30% of workers who remained with the same employer over the year reported wage losses...including almost 20% of those who had indicated that they were promoted. An additional 24% reported wage gains greater than 20%. He concludes that the most likely explanation of these results is response error.

If such results are observed for workers remaining with their firms in 1987, what of workers who lost and found a new job during that year. This is shown in the table below.

Wage Change in 1987 for Workers Losing Their Job and Staying With Their Employers, LMAS

	Losing and Finding Job in 1987	Staying with Employer in 1987 (no promotion)
% with loss	37%	29%
% with loss > 10%	28%	19%
% with gain	48%	55%
% with gain > 20%	27%	24%

From Boothby (1991)

There are a large number of gainers and losers among both groups of workers, and the results for those staying with their employer do suggest substantial measurement error. While workers losing their jobs were more likely, according to these data, to experience a wage loss, it seems likely that the proportion experiencing a loss, and the size of that loss are overestimated in the data. The results for workers remaining with their firm seem unlikely. Similarly, the wage gains appear very large for persons remaining in the same company (24% of the employees would have received wage gains in excess of 20% according to these data), suggesting that they are likely overestimated for job losers as well. In short, these results suggest a substantial, but unknown, amount of measurement error in the wage change.

Table A-1: Regression Results for a Logistic Model Estimating the Probability of Being Permanently Laid-off

Independent Variable	Coefficient	Standard Error
Intercept	-3.51	0.26
Age		
16-24	--	--
25-34	-.259	.049
35-44	-.374	.059
45-54	-.390	.072
55-64	-.244	.090
Education		
Elementary	.221	.100
Some High School	.096	.081
High School Complete	-0.87	.077
College Diploma or Certificate	.045	.082
University	--	--
Hourly wage rate	-.027	.004
Unionized job	-.317	.053
Industry		
Forestry/mining	.880	.120
Construction	1.030	.108
Manufacturing	.043	.095
Distributive Services	-0.070	.101
Consumer Services	0.221	.083
Public Services	0.229	.090
Business Services	--	--
Occupation		
Managers	--	--
Natural and Social Sciences	.142	.110
Clerical	.502	.095
Sales	.312	.108
Services	.299	.100
Primary,Processing and Fabricating	.945	.100
Construction	1.068	.116
Other	.584	.105
Firm Size		
< 20 employees	.769	.058
20-99	.462	.065
100-499	.379	.074
500 +	--	--
Unknown	.584	.066
Provinces		
Atlantic	--	--
Quebec	-.278	.084
Ontario	-.528	.145
Man/Sask	-.222	.120
Alta/B.C.	-.031	.086

Number of Observations = 46,700
Permanent Layoffs = 1: 3,300
Model chi squared 2547

Source: Labour Market Activity Survey

NOTE:

1. Where the workers separates from the firm and does not return during the same or the following year.

2. The number of permanent layoffs from a firm divided by the number of persons employed in the firm at any time during the year. The numerators and denominators are summed across all firms in an industry or other groups to obtain the values for industries, etc. For more detail on definitions and additional data see Statistics Canada (1992).

3. The number of persons temporarily laid-off from a firm divided by the number of persons employed in the firm at any time during the year.

4. When the cyclical behavior of quits and permanent layoffs are taken together, one finds that the proportion of workers separating from firms (due to quits or permanent layoffs) was relatively flat over the 1980s business cycle at around one in every five in most years. If anything, the total permanent separations rate was slightly pro-cyclical, falling as GDP fell. Fewer, not more, workers separate from their firms during recessions. This is also observed in American data (Akerlof, Rose & Yellen, 1988). When this information is combined with the observation that hirings fell dramatically during the recession it is evident that worker mobility and labour reallocation slowed considerably during the recession. One simple measure of labour turnover is the sum of the permanent separations and hiring rates divided by two. This represent the average "flow" of workers entering and exiting firms. The labour turnover measure declines in virtually all industries during the 1981-82 recession (chart 5), and by about one-third for the economy as a whole, from 23% in 1979 to 15.5% on 1982. Recently notions have been put forward in the U.S. which are at odds with this pattern. Hall (1991) relies on two observations to develop the idea that worker-job matching <u>rise</u> in a recession without affecting overall efficiency. He argues that "in recession, the labour market carries out a much increased volume of worker-job matching, without suffering a decline in efficiency in the process". He suggests that the economy faces a choice at the margin between producing goods and reorganizing, including in the latter case, the reorganization of labour among firms. During recessions, more labour is allocated to the "reorganization" activity than is the case during expansionary years. The decline in labour mobility suggests such theories are not applicable in Canada.

5. The importance of temporary layoffs has been observed in the U.S. by Feldstein (1976) among others. He argued that for most persons laid-off, the standard job search model does not apply, since the return to work is not the result of a decision by the employee, but rather a recall by the employer.

He also argued that the pattern of temporary unemployment in certain types of jobs are part of the package that workers voluntarily choose. He suggested the unemployment insurance subsidy causes temporary layoffs where they would not otherwise occur. Based on this, he argued for full experience rates of the UI system.

6. Unfortunately, it is not possible to determine the destination of the worker following their separation (i.e. to another firm, unemployment or not in labour force) in these data. However, given the fact that layoffs are much more likely to result in unemployment than are quits (Abbott, Beach, Kaliski, 1989), and that the largest cyclical variations are the decline in quits and rise in temporary layoffs, the latter likely plays a major role in the rise in the EU flows.

7. There was not a compensating difference in the temporary layoffs. The temporary layoff rates were: Firm with <20 employees -- 7.7%; 20-99 -- 7.2%; 100-499 -- 7.7%; 500+ -- 6.1%.

8. A Hazard rate indicates the rate at which workers in a particular group are laid off relative to that of all workers. If the rate is 1.3, it means workers in that group are laid off 1.3 times as often as workers in general. It is calculated by dividing the percentage of laid-off workers in any given group by the percentage of the full-time workers in the same group.

9. The manner in which unemployment spells are measured in the LMAS has been criticized by Jones and Riddell (1991). They conclude that an editing procedure results in an underestimate of the number of transitions into and out of unemployment, and hence reduces the value of the survey for the study of labour market dynamics. Here, the total observed unemployment over a long period (1 year) is the central focus, and it is less affected by this procedure than are the flows into and out of unemployment, and the duration of particular spell. Comparisons with the Labour Force Survey suggest the LMAS does reasonably well in capturing total unemployment. It is underestimated by 5% to 8% early in the reference (Jan. - May) year, and over-estimated late in the year.

10. The sample size was too small to standardize on all variables simultaneously. Given the marginal change in the rates in the uni-variate standardization, however, this would likely make little difference.

11. Efforts were made to reduce measurement error in these results. Observations with extraordinary large residuals (outliers) were excluded. Some errors result from the respondent reporting an unusual number of hours per week (e.g. more than 100) along with a weekly wage. When converted to hourly earnings, the result was questionable. All full-time jobs with weekly hours outside then 30 to 60 range were

excluded. More effort was spent editing the wage variable during the data evaluation stage than any other. Irregularities were manually verified (by using information on occupation, industry, etc.). The median change in the wage was used in the tables so that it would not be so susceptible to outliers.

12. Corrections for heteroscedasticity were used.

13. To test this more directly, particular industry mobility patterns were included as dummy variables in the regression, such as a move from manufacturing to consumer services. That is, the relationship between a change in wage and a specific change in industry was assessed. These too had no significant effect on wage gain or loss. Furthermore, the wage in the lost job was dropped, as this might have captured most of the industry effect, but the result remained insignificant. This result was also observed in an earlier analysis of worker displacement (Picot & Wannell, 1987).

14. Since the job loss in the earlier period occurred between 1981 and 1984, this date refers to 1 to 5 years after job loss, giving the unemployment rate among displaced workers a longer period to fall (unless it reaches a steady state in under one year).

15. As mentioned, longer recall over the 1981-85 period means some layoffs with short unemployment spell will be excluded, rendering the result for the 81-85 period an underestimate of the difficulties encountered by workers relative to that for the 88-89 period.

16. These are subject to the measurement error discussed earlier. Also, these numbers are somewhat different from these reported earlier because the "no change" category was deleted to make the results comparable in the two periods.

17. This effect was stronger during the 1988-89 period. The coefficients on the (logarithm of) wage in lost job variable were for males: -.62 in 88-89, -.49 in 81-84, for females -.71 in 88-89 and -.45 in 81-84. All were significant.

18. Recent work in both Canada and the United States suggests that overall trends in employment for the economy as a whole and structural change among industries account for only a limited amount of the job loss taking place at the level of the firm. Davis and Haltiwanger (1990) found that in the United States, the variation in job loss in manufacturing industries was associated with the reallocation of jobs among firms within an industry, not with an industry-wide or economy-wide downturn. Baldwin and Gorecki (1990), studying job loss and gain in the Canadian manufacturing sector, also concluded that most of the reallocation of jobs was related to intra-industry shifts among firms. Economic forces such as intra-industry competition are responsible for many permanent layoffs.

19. In part laid off workers have short job tenure because they were laid off (and hence were unable to develop a long tenure). The probability of layoff and duration in the job are to some extent measures of the same thing.

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